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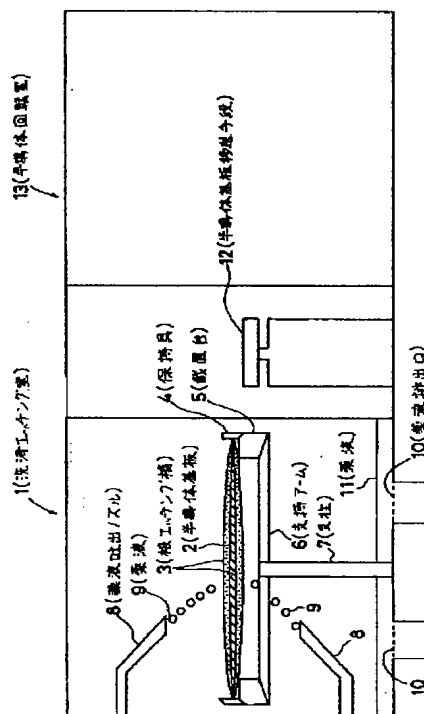
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(54) 【発明の名称】 半導体ウェット装置

(57) 【要約】

【目的】 半導体基板に洗浄不十分部分や被エッチング膜のエッチング残り部分を生じさせないような半導体ウェット装置を提供する

【構成】 洗浄エッチング室1に隣接して半導体基板回転室13が設けられている。該半導体基板回転室13には、洗浄エッチング室1から移送されている半導体基板2を保持し且つ保持した半導体基板2を水平方向へ所定量回転させる半導体基板回転手段が設けられている。洗浄エッチング室1と半導体基板回転室13との間には、洗浄エッチング室1において洗浄又はエッチングされた半導体基板2を半導体基板回転室13に移送すると共に、該半導体基板回転室13内で水平方向へ所定量回転した半導体基板2を洗浄エッチング室1に移送して載置台5に再度載置支持せしめる半導体基板移送手段12が設けられている。



【特許請求の範囲】

【請求項1】 半導体基板を洗浄又はエッチングするための洗浄エッチング室と、該洗浄エッチング室内に回転可能に立設された支柱と、該支柱の上部に保持され水平方向へ延びる少なくとも3つのアーム部材と、各アーム部材の先端部に設けられ半導体基板を載置支持する載置台とを備えた半導体ウェット装置であって、上記洗浄エッチング室に隣接して設けられ上記洗浄エッチング室から移送されてくる半導体基板を保持して水平方向へ所定量回転させる半導体基板回転室と、上記洗浄エッチング室内で洗浄又はエッチングされた半導体基板を上記半導体基板回転室に移送すると共に半導体基板回転室内で水平方向へ所定量回転した半導体基板を上記洗浄エッチング室に移送し且つ上記載置台に載置支持させる半導体基板移送手段とを備えていることを特徴とする半導体ウェット装置。

【請求項2】 半導体基板を洗浄又はエッチングするための洗浄エッチング室と、該洗浄エッチング室内に回転可能に立設された支柱と、該支柱の上部に保持され水平方向へ延びる少なくとも3つのアーム部材と、各アーム部材の先端部に設けられ半導体基板を載置支持する載置台とを備えた半導体ウェット装置であって、上記載置台に載置支持されている半導体基板を保持して上記載置台から離脱させると共に、半導体基板が上記載置台から離脱し上記支柱が所定量回転した後に保持している半導体基板を上記載置台に再度載置支持させる半導体基板保持手段を備えていることを特徴とする半導体ウェット装置。

【請求項3】 半導体基板を洗浄又はエッチングするための洗浄エッチング室と、該洗浄エッチング室内に回転可能に立設された支柱と、該支柱の上部に保持され水平方向へ延びる少なくとも3つのアーム部材と、各アーム部材の先端部に設けられ半導体基板を載置支持する載置台とを備えた半導体ウェット装置であって、上記洗浄エッチング室に隣接して設けられ上記洗浄エッチング室から移送されてくる半導体基板を保持してその表裏を反転させる半導体基板反転室と、上記洗浄エッチング室内で洗浄又はエッチングされた半導体基板を上記半導体基板反転室に移送すると共に半導体基板反転室内で表裏反転した半導体基板を上記洗浄エッチング室に移送し上記載置台に載置支持させる半導体基板移送手段とを備えていることを特徴とする半導体ウェット装置。

【請求項4】 上記載置台は、その上面に半導体基板をその下面から載置支持するピン部材を備えていることを特徴とする請求項1～3のいずれか1項に記載の半導体ウェット装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、半導体ウェット装置に関し、詳しくは半導体基板の裏面をウェット洗浄したり

又は半導体基板における被エッチング膜をウェットエッチングする装置に関する。

【0002】

【従来の技術】 近年、半導体基板に対して行なわれるウェット洗浄方法及びウェットエッチング方法は多様化しており、半導体基板に対するウェット洗浄又はウェットエッチングは自動的且つ枚葉式に行なわれるようになってきている。

【0003】 以下、図面を参照しながら従来の半導体ウェット装置について説明する。

【0004】 図3は従来の半導体ウェット装置の概略断面図であり、図4は上記半導体ウェット装置の見上げ図である。同図において、1は半導体基板2に対してウェット洗浄又はウェットエッチングを行なうための洗浄エッチング室、3は半導体基板2の表裏面に形成された被エッチング膜、4は半導体基板2を載置支持する3つの載置台5の各外端部から上方へ突出し半導体基板2を保持する保持具、6は各載置台5を一端部において保持する3本の支持アーム、7は各支持アーム6の他端部を保持する回転可能な支柱、8は半導体基板2に対して薬液9を吐出する薬液吐出口、10は半導体基板2に対して吐出された薬液11を排出する薬液排出口である。

【0005】 上記の半導体ウェット装置においては、支柱7を回転することによって載置台5の上に載置され且つ保持具4により保持された半導体基板2を回転しながら、弗酸系の混合薬液や洗浄液（酸、アルカリ、溶剤等）等の薬液9を薬液吐出ノズル8から洗浄及びエッチング室1内に導入すると共に導入した薬液9を半導体基板2の中央部付近に吐出することにより、半導体基板2の被エッチング膜3を洗浄又はエッチングする。

【0006】

【発明が解決しようとする課題】 しかるに、上記半導体装置においては、薬液吐出ノズル8から吐出された薬液9が、載置台5及び支持アーム6によって進路を妨げられ、半導体基板2に十分に吹き付けられないため、半導体基板2に洗浄不十分部分やエッチング残り部分が生じするという問題点を有している。

【0007】 上記に鑑み、本発明は、半導体基板に洗浄不十分部分や被エッチング膜のエッチング残り部分を生じさせないような半導体ウェット装置を提供することを目的とする。

【0008】

【課題を解決するための手段】 上記問題点を解決するため、請求項1の発明は、洗浄エッチング室内で洗浄又はエッチングが行なわれた半導体基板を隣室で水平方向へ所定量回転した後、再度洗浄エッチング室に戻し、半導体基板を前回と異なる部位において載置支持するものである。

【0009】 具体的に請求項1の発明が講じた解決手段は、半導体基板を洗浄又はエッチングするための洗浄エ

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ッティング室と、該洗浄エッチング室内に回転可能に立設された支柱と、該支柱の上部に保持され水平方向へ延びる少なくとも3つのアーム部材と、各アーム部材の先端部に設けられ半導体基板を載置支持する載置台とを備えた半導体ウェット装置であって、上記洗浄エッチング室に隣接して設けられ上記洗浄エッチング室から移送されてくる半導体基板を保持して水平方向へ所定量回転させる半導体基板回転室と、上記洗浄エッチング室内で洗浄又はエッチングされた半導体基板を上記半導体基板回転室に移送すると共に半導体基板回転室内で水平方向へ所定量回転した半導体基板を上記洗浄エッチング室に移送し且つ上記載置台に載置支持させる半導体基板移送手段とを備えている構成とするものである。

【0010】請求項2の発明は、洗浄エッチング室で洗浄又はエッチングが行なわれた半導体基板を、載置台から一時離脱させ、載置台を所定量水平方向へ回転させた後に載置台に戻し、半導体基板を前回と異なる部位において載置支持するものである。

【0011】具体的に請求項2の発明が講じた解決手段は、半導体基板を洗浄又はエッチングするための洗浄エッチング室と、該洗浄エッチング室内に回転可能に立設された支柱と、該支柱の上部に保持され水平方向へ延びる少なくとも3つのアーム部材と、各アーム部材の先端部に設けられ半導体基板を載置支持する載置台とを備えた半導体ウェット装置であって、上記載置台に載置支持されている半導体基板を保持して上記載置台から離脱させると共に、半導体基板が上記載置台から離脱し上記支柱が所定量回転した後に保持している半導体基板を上記載置台に再度載置支持させる半導体基板保持手段を備えている構成とするものである。

【0012】請求項3の発明は、洗浄エッチング室内で洗浄又はエッチングが行なわれた半導体基板を隣室で反転させた後、洗浄エッチング室に戻し、半導体基板を前回とは表裏反転した状態で載置支持するものである。

【0013】具体的に請求項3の発明が講じた解決手段は、半導体基板を洗浄又はエッチングするための洗浄エッチング室と、該洗浄エッチング室内に回転可能に立設された支柱と、該支柱の上部に保持され水平方向へ延びる少なくとも3つのアーム部材と、各アーム部材の先端部に設けられ半導体基板を載置支持する載置台とを備えた半導体ウェット装置であって、上記洗浄エッチング室に隣接して設けられ上記洗浄エッチング室から移送されてくる半導体基板を保持してその表裏を反転させる半導体基板反転室と、上記洗浄エッチング室内で洗浄又はエッチングされた半導体基板を上記半導体基板反転室に移送すると共に半導体基板反転室内で表裏反転した半導体基板を上記洗浄エッチング室に移送し上記載置台に載置支持させる半導体基板移送手段とを備えている構成とするものである。

【0014】請求項4の発明は、半導体基板と載置台と

の接触面積を少なくするため、請求項1～3の構成に、上記載置台は、その上面に半導体基板をその下面から載置支持するピン部材を備えているという構成を付加するものである。

【0015】

【作用】請求項1の構成により、洗浄エッチング室で洗浄又はエッチングされた半導体基板を半導体基板移送手段により半導体基板回転室に移送し、該半導体基板回転室において水平方向へ所定量回転された半導体基板を洗浄エッチング室に戻し載置台に載置支持させると、半導体基板は前回とは異なった部位において載置支持される。

【0016】請求項2の構成により、載置台に載置支持されている半導体基板を半導体基板保持手段により保持した後、支柱を所定量回転すると、載置台のみが水平方向へ所定量回転する。その後、半導体基板保持手段が保持している半導体基板を載置台に載置支持させると、半導体基板は前回とは異なった部位において載置台により支持される。

【0017】請求項3の構成により、洗浄エッチング室で洗浄又はエッチングされた半導体基板を半導体基板移送手段により半導体基板反転室に移送し、半導体基板反転室において表裏反転した半導体基板を再度洗浄エッチング室に戻し載置台に載置支持させると、半導体基板は前回とは表裏反転した状態で載置台に支持される。

【0018】請求項4の構成により、載置台の上面に半導体基板をその下面から載置支持するピン部材を備えているため、半導体基板と載置台との接触面積が少なくなるので、半導体基板に対して吐出される薬液が載置台によって阻止され難くなる。

【0019】

【実施例】以下、本発明の一実施例を図面に基づいて説明する。

【0020】図1は本発明の第1実施例に係る半導体ウェット装置の概略断面図である。同図において、1は半導体基板2に対するウェット洗浄又はウェットエッチングを行なうための洗浄エッチング室、3は半導体基板2の表裏面に形成された被エッチング膜、4は半導体基板2を載置支持する3か所の載置台5の各外端部から上方へ突出し半導体基板2を保持する保持具、6は各載置台5を一端部で保持する3本の支持アーム、7は各支持アーム6の他端部を保持する回転可能な支柱、8は半導体基板2に対して薬液9を吐出する薬液吐出ノズル、10は半導体基板2に対して吐出された薬液11を排出する薬液排出口である。

【0021】本第1実施例の特徴として、洗浄エッチング室1に隣接して半導体基板回転室13が設けられており、該半導体基板回転室13には、図示は省略したが、洗浄エッチング室1から移送されている半導体基板2を保持し且つ保持した半導体基板2を水平方向へ所定量回

転させる半導体基板回転手段が設けられている。

【0022】また、本第1実施例の特徴として、洗浄エッチング室1と半導体基板回転室13との境界部には、洗浄エッチング室1において洗浄又はエッチングされた半導体基板2を半導体基板回転室13に移送すると共に、該半導体基板回転室13内で水平方向へ所定量回転した半導体基板2を洗浄エッチング室1に移送して載置台5に再度載置支持させる半導体基板移送手段12が設けられている。

【0023】以下、上記のように構成された第1実施例に係る半導体ウェット装置の動作を説明する。

【0024】まず、洗浄エッチング室1において、薬液吐出ノズル8に弗酸系の混合液又は洗浄液（酸、アルカリ、溶剤等）からなる薬液を導入し、導入した薬液9を半導体基板2の中央部付近に吐出させる。同時に支柱7を回転することにより載置台5ひいては該載置台5に載置支持された半導体基板2を水平方向へ回転し、吐出された薬液9を半導体基板2の被エッチング膜3に行き渡らせ、該被エッチング膜3に対して洗浄及びエッチングを行なう。使用された薬液は薬液排液口10から排液される。

【0025】この場合、半導体基板2における保持具4に当接している部分には回転中に薬液9が巻き込まれるので、半導体基板2における保持具4に当接している部分は洗浄不十分部分やエッチング残り部分にはならないが、半導体基板2における載置台5及び支持アーム6と対向している部分は洗浄不十分部分やエッチング残り部分となる。

【0026】そこで、支柱7の回転を中止すると共に薬液吐出ノズル8からの薬液の吐出を止めた後、半導体基板移送手段12により半導体基板2を半導体基板回転室13に移動する。そして、半導体回転室13において、洗浄エッチング室1から移送されてきた半導体基板2を保持し且つ保持した半導体基板2を水平方向へ所定量例えば180度回転する。次に、水平方向へ所定量回転した半導体基板2を半導体基板移送手段12により再度洗浄エッチング室1に戻し、載置台5に載置支持させる。

【0027】このようにすると、半導体基板2は前回と180度水平方向へ回転された状態で載置台5に載置支持されるので、半導体基板2における載置台5及び支持アーム6と対向している部分は前回と異なる。このような状態で、薬液9を薬液吐出ノズル8から半導体基板2に吐出すると、半導体基板2における洗浄不十分部分やエッチング残り部分が解消する。

【0028】以下、本発明の第2実施例に係る半導体ウェット装置について説明する。

【0029】本第2実施例の特徴として、図示は省略したが、上記第1実施例と同様構造の洗浄エッチング室と、該洗浄エッチング室に隣接する半導体基板反転室とが設けられており、該半導体基板反転室には、図示は省

略したが、洗浄エッチング室から移送されている半導体基板を保持し且つ保持した半導体基板を表裏反転させる半導体基板反転手段が設けられている。

【0030】また、本第2実施例の特徴として、洗浄エッチング室と半導体基板反転室との境界部には、洗浄エッチング室において洗浄又はエッチングされた半導体基板を半導体基板反転室に移送すると共に、該半導体基板反転室内で表裏反転した半導体基板を洗浄エッチング室に移送して載置台に再度載置支持せしめる半導体基板移送手段が設けられている。

【0031】以下、上記のように構成された第2実施例に係る半導体ウェット装置の動作を説明する。

【0032】まず、洗浄エッチング室において、薬液吐出ノズルから薬液を半導体基板に吐出させると共に支柱を回転することにより載置台に載置支持された半導体基板を水平方向へ回転し、半導体基板の被エッチング膜に対して洗浄及びエッチングを行なう。この場合、半導体基板における保持具に当接している部分は洗浄不十分部分やエッチング残り部分にはならないが、半導体基板における載置台及び支持アームと対向している部分は洗浄不十分部分やエッチング残り部分となる。

【0033】そこで、支柱の回転を中止すると共に薬液吐出ノズルからの薬液の吐出を止めた後、半導体基板移送手段により半導体基板を半導体基板反転室に移動する。そして、半導体反転室において、洗浄エッチング室から移送されてきた半導体基板を保持し且つ保持した半導体基板を表裏反転させる。次に、表裏反転した半導体基板を半導体基板移送手段により再度洗浄エッチング室に戻し、載置台に載置支持させる。

【0034】このようにすると、半導体基板は前回とは表裏反転した状態で載置台に載置支持されるので、半導体基板における載置台及び支持アームと対向している部分は前回と異なる。このような状態で、薬液を半導体基板に吐出すると、半導体基板における洗浄不十分部分やエッチング残り部分が解消する。

【0035】以下、本発明の第3実施例に係る半導体ウェット装置について説明する。

【0036】本第3実施例の特徴として、上記第1実施例と同様の洗浄エッチング室には、図示は省略したが、半導体基板保持手段が設けられており、該半導体基板保持手段は、載置台に載置支持されている半導体基板を保持して載置台から離脱させると共に、半導体基板が載置台から離脱し、支柱が水平方向へ所定量回転した後に、保持している半導体基板を載置台に再度載置支持させる。

【0037】以下、上記のように構成された半導体ウェット装置の動作を説明する。

【0038】まず、洗浄エッチング室において、薬液吐出ノズルから薬液を半導体基板に吐出させると共に、支柱を回転することにより載置台に載置支持されている半

導体基板を水平方向へ回転し、半導体基板の被エッチング膜に対して洗浄及びエッチングを行なう。この場合、半導体基板における載置台及び支持アームと対向している部分は洗浄不十分部分やエッチング残り部分となる。

【0039】そこで、支柱の回転を中止すると共に薬液吐出ノズルからの薬液の吐出を止めた後、上記の半導体基板保持手段を駆動させて、載置台に載置支持されている半導体基板を保持して載置台から離脱させた後、支柱を水平方向へ所定量例えば180度回転した後に、保持している半導体基板を載置台に再度載置支持させる。

【0040】このようにすると、半導体基板は前回と180度水平方向へ回転された状態で載置台に載置支持されるので、半導体基板における載置台及び支持アームと対向している部分は前回と異なる。このような状態で、薬液を薬液吐出ノズルから半導体基板に吐出すると、半導体基板における洗浄不十分部分やエッチング残り部分

が解消する。

【0041】図2は、上記第1～第3実施例に係る半導体ウェット装置の変形例を示しており、同図に示すように、載置台5の上面には、半導体基板2をその下面から載置支持するピン部材14が突設されている。このため、半導体基板2と載置台5との接触面積が少なくなるので、半導体基板2に対して吐出される薬液が載置台5によって阻止され難くなる。

【0042】(表1)は、上記第1実施例に係る半導体ウェット装置を用いて半導体基板にエッチング処理を行なった場合と、従来の半導体ウェット装置を用いて半導体基板にエッチング処理を行なった場合との比較を示している。

【0043】

【表1】

	処理内容	エッチング残りの有無
従来の半導体ウェット装置	エッチング時間10分	載置台部分エッチ残り (1mm角程度)
第1実施例のウェット装置	エッチング時間3分、180度回転後エッチング時間3分	無し

【0044】(表1)から明らかなように、第1実施例に係る半導体ウェット装置により(表1)の条件を用いて半導体基板にエッチング処理を行なった結果、半導体基板にはエッチング残り部分が発生しなかった。

【0045】

【発明の効果】請求項1の発明に係る半導体ウェット装置によると、洗浄エッチング室から移送されてくる半導体基板を保持し水平方向へ所定量回転させる半導体基板回転室と、洗浄エッチング室内で洗浄又はエッチングされた半導体基板を半導体基板回転室に移送すると共に水平方向へ所定量回転した半導体基板を洗浄エッチング室に移送する半導体基板移送手段とを備えているため、洗浄エッチング室で洗浄又はエッチングされた半導体基板を、半導体基板移送手段により半導体基板回転室に移送し、半導体基板回転室において水平方向へ所定量回転した後、洗浄エッチング室に戻し載置台に載置支持させると、半導体基板は前回とは異なった部位において載置支持されるので、半導体基板における洗浄不十分部分やエッチング残り部分は発生しない。

【0046】請求項2の発明に係る半導体ウェット装置によると、載置台に載置支持されている半導体基板を保持して載置台から離脱させると共に支柱が所定量回転し

た後に保持している半導体基板を載置台に再度載置支持させる半導体基板保持手段を備えているため、洗浄又はエッチングされた半導体基板を半導体基板保持手段により保持して載置台から離脱させた後に支柱を所定量回転させ、その後、半導体基板保持手段が保持している半導体基板を載置台に載置支持させると、半導体基板は前回とは異なった部位において載置台により支持されるので、半導体基板における洗浄不十分部分やエッチング残り部分は発生しない。

【0047】請求項3の発明に係る半導体ウェット装置によると、洗浄エッチング室から移送されてくる半導体基板を保持し表裏反転させる半導体基板反転室と、洗浄エッチング室内で洗浄又はエッチングされた半導体基板を半導体基板反転室に移送すると共に反転した半導体基板を洗浄エッチング室に移送する半導体基板移送手段とを備えているため、洗浄エッチング室で洗浄又はエッチングされた半導体基板を半導体基板移送手段により半導体基板反転室に移送し、半導体基板反転室において表裏反転した後、洗浄エッチング室に戻し載置台に載置支持させると、半導体基板は前回とは表裏反転した状態で載置支持されるので、半導体基板における洗浄不十分部分やエッチング残り部分は発生しない。

【0048】請求項4の発明に係る半導体ウェット装置によると、載置台の上面に半導体基板をその下面から載置支持するピン部材を備えているため、半導体基板と載置台との接触面積が少なくなるので、半導体基板に対して吐出される薬液が載置台によって阻止され難くなる

【図面の簡単な説明】

【図1】本発明の第1実施例における半導体ウェット装置の概略断面図である。

【図2】本発明の第1～第3実施例に係る半導体ウェット装置の概略断面図である。

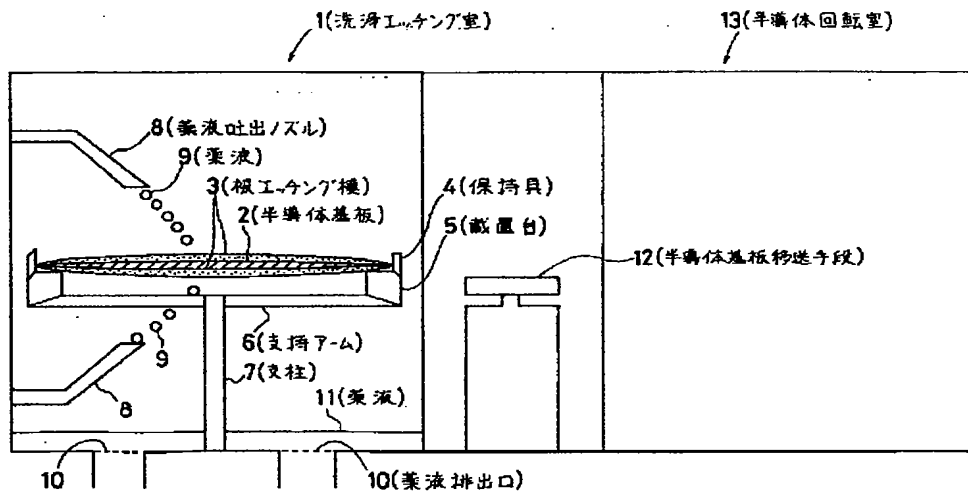
【図3】従来の半導体ウェット装置の概略断面図である。

【図4】従来の半導体ウェット装置の概略見上げ図である。

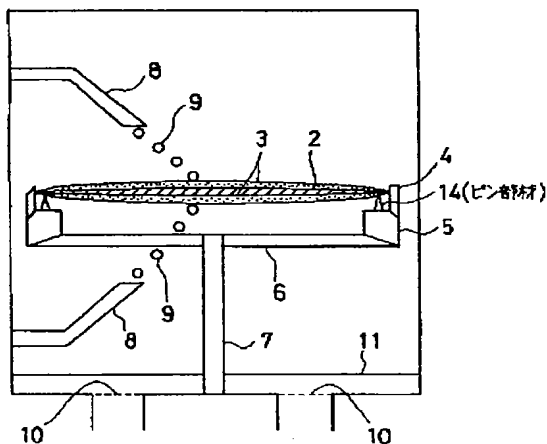
【符号の説明】

- | | |
|----|-----------|
| 1 | 洗浄エッチング室 |
| 2 | 半導体基板 |
| 3 | 被エッチング膜 |
| 4 | 保持具 |
| 5 | 載置台 |
| 6 | 支持アーム |
| 7 | 支柱 |
| 8 | 薬液吐出ノズル |
| 9 | 吐出された薬液 |
| 10 | 薬液排液口 |
| 11 | 排出される薬液 |
| 12 | 半導体基板移送手段 |
| 13 | 半導体基板回転室 |
| 14 | ピン部材 |

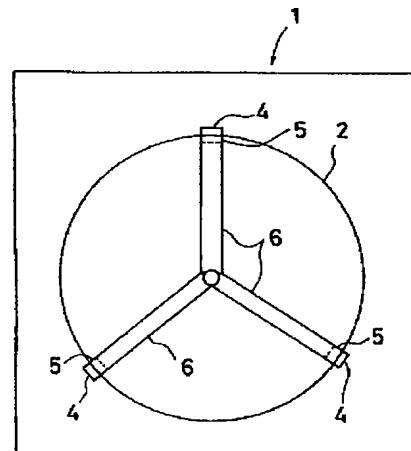
【図1】



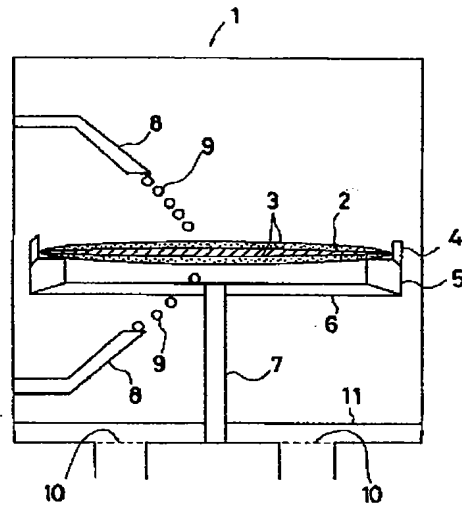
【図2】



【図4】



【図3】



PATENT ABSTRACTS OF JAPAN

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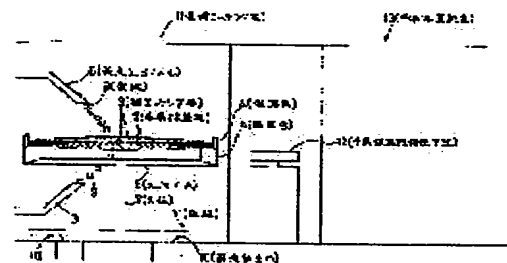
(72)Inventor : TABATA SHIGERU
MUROZONO IZUMI

54) SEMICONDUCTOR SUBSTRATE WETTING APPARATUS

57)Abstract:

PURPOSE: To provide a semiconductor substrate wetting apparatus which enables a semiconductor substrate not to be partially left not cleansed enough and an etched film not to be partially left unetched.

CONSTITUTION: A semiconductor substrate rotating chamber 13 is provided adjacent to a cleansing.etching chamber 1. A semiconductor substrate rotating means which holds a semiconductor substrate 2 transferred from the cleansing-etching chamber 1 and horizontally rotates it by a prescribed angle is provided inside the semiconductor substrate rotating chamber 13. A semiconductor substrate transfer means 12, which not only transfers the semiconductor substrate 2 cleansed or etched in the cleansing.etching chamber 1 to the semiconductor substrate rotating chamber 13 but also transfers the other semiconductor substrate 2 horizontally rotated by a prescribed angle inside the semiconductor substrate rotating chamber 13 to the cleansing.etching chamber 1 and places it again on a mounting pad 5, is provided between the cleansing.etching chamber 1 and the semiconductor substrate rotating chamber 13.



LEGAL STATUS

Date of request for examination]

Date of sending the examiner's decision of rejection]

Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

Date of final disposal for application]

Patent number]

Date of registration]

Number of appeal against examiner's decision of rejection]

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NOTICES *

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LAIMS

Claim(s)]

Claim 1] The washing etching chamber for washing or etching a semi-conductor substrate, and the stanchion set up by this washing etching interior of a room pivotable, At least three arm members which are held in the upper part of this stanchion and prolonged horizontally, It is semi-conductor wet equipment equipped with the installation base which is established in the point of each arm member and carries out installation support of the semi-conductor substrate. The semi-conductor substrate turning room which holds the semi-conductor substrate which is adjoined and formed in the above-mentioned washing etching chamber, and is transported from the above-mentioned washing etching chamber, and carries out specified quantity rotation horizontally, While transporting the semi-conductor substrate washed or etched in the above-mentioned washing etching interior of a room to the above-mentioned semi-conductor substrate turning room Semi-conductor wet equipment characterized by having the semi-conductor substrate migration means which transports [at the semi-conductor substrate rotation interior of a room] horizontally the semi-conductor substrate which carried out specified quantity rotation in the above-mentioned washing etching chamber, and the above-mentioned installation base is made to carry out installation support.

Claim 2] The washing etching chamber for washing or etching a semi-conductor substrate, and the stanchion set up by this washing etching interior of a room pivotable, At least three arm members which are held in the upper part of this stanchion and prolonged horizontally, While holding the semi-conductor substrate by which is semi-conductor wet equipment equipped with the installation base which is established in the point of each arm member and carries out installation support of the semi-conductor substrate, and installation support is carried out on the above-mentioned installation base and making it secede from the above-mentioned installation base semi-conductor wet equipment characterized by having a semi-conductor substrate maintenance means to make the above-mentioned installation base carry out installation support of the semi-conductor substrate currently held after a semi-conductor substrate secedes from the above-mentioned installation base and the above-mentioned stanchion carries out specified quantity rotation again.

Claim 3] The washing etching chamber for washing or etching a semi-conductor substrate, and the stanchion set up by this washing etching interior of a room pivotable, At least three arm members which are held in the upper part of this stanchion and prolonged horizontally, It is semi-conductor wet equipment equipped with the installation base which is established in the point of each arm member and carries out installation support of the semi-conductor substrate. The semi-conductor substrate reversal room which the semi-conductor substrate which is adjoined and formed in the above-mentioned washing etching chamber, and is transported from the above-mentioned washing etching chamber is held [room], and reverses the front flesh side, While transporting the semi-conductor substrate washed or etched in the above-mentioned washing etching interior of a room to the above-mentioned semi-conductor substrate reversal room Semi-conductor wet equipment characterized by having the semi-conductor substrate migration means which transports the semi-conductor substrate which carried out front flesh-side reversal in the semi-conductor substrate reversal interior of a room to the above-mentioned washing etching chamber, and the above-mentioned installation base is made to carry out installation support.

Claim 4] The above-mentioned installation base is semi-conductor wet equipment given in any 1 term of claims -3 characterized by equipping the top face with the pin member which carries out installation support of the semi-conductor substrate from the inferior surface of tongue.

Translation done.]

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ETAILED DESCRIPTION

Detailed Description of the [Invention]

0001]

Industrial Application] About semi-conductor wet equipment, wet washing of the rear face of a semi-conductor substrate is carried out in detail, or this invention relates to the equipment which carries out wet etching of the etched film in a semi-conductor substrate.

0002]

Description of the Prior Art] In recent years, the wet washing approach and the wet etching approach which are performed to a semi-conductor substrate are diversified, and wet washing or wet etching to a semi-conductor substrate is increasingly performed to automatic and single wafer processing.

0003] Hereafter, conventional semi-conductor wet equipment is explained, referring to a drawing.

0004] Drawing 3 is the outline sectional view of conventional semi-conductor wet equipment, the above-mentioned semi-conductor wet equipment looks up at drawing 4, and it is drawing. A washing etching chamber 1 to perform wet washing or wet etching to the semi-conductor substrate 2 in this drawing, The etched film 3 with which 3 was formed in the front rear face of the semi-conductor substrate 2, the holder which holds the semi-conductor substrate 2 upwards from each heel of three installation bases 5 where 4 carries out installation support of the semi-conductor substrate 2, Three support arms on which 6 holds each installation base 5 in the end section, the pivotable stanchion with which 7 holds the other end of each support arm 6, the drug solution delivery where 8 carries out the regurgitation of the drug solution 9 to the semi-conductor substrate 2, and 10 are drug solution exhaust ports which discharge the drug solution 11 breathed out to the semi-conductor substrate 2.

0005] Rotating the semi-conductor substrate 2 which was laid on the installation base 5 and held by the holder 4 by rotating a stanchion 7 in above semi-conductor wet equipment By carrying out the regurgitation of the drug solution 9 introduced while introducing the drug solutions (an acid, alkali, solvent, etc.) 9, such as a mixed drug solution of a fluoric acid system, and a penetrant remover, in washing and an etching chamber 1 from the drug solution regurgitation nozzle 8 near the center section of the semi-conductor substrate 2, the etched film 3 of the semi-conductor substrate 2 is washed or etched.

0006]

Problem(s) to be Solved by the Invention] However, in the above-mentioned semiconductor device, since the drug solution 9 breathed out from the drug solution regurgitation nozzle 8 has a course barred and is not fully sprayed on the semi-conductor substrate 2 by the installation base 5 and the support arm 6, it has the trouble that a washing inadequate part and the etching remaining part arise in the semi-conductor substrate 2.

0007] This invention aims at offering semi-conductor wet equipment which does not make a semi-conductor substrate produce a washing inadequate part and the etching remaining part of the etched film in view of the above.

0008]

Means for Solving the Problem] In order to solve the above-mentioned trouble, after carrying out specified quantity rotation of the semi-conductor substrate with which washing or etching was performed in the washing etching interior of a room horizontally in the next room, invention of claim 1 is again returned to a washing etching chamber, and carries out installation support of the semi-conductor substrate in a different part from 1st time.

0009] The solution means which invention of claim 1 provided concretely The washing etching chamber for washing or etching a semi-conductor substrate, and the stanchion set up by this washing etching interior of a

room pivotable, At least three arm members which are held in the upper part of this stanchion and prolonged horizontally, It is semi-conductor wet equipment equipped with the installation base which is established in the point of each arm member and carries out installation support of the semi-conductor substrate. The semi-conductor substrate turning room which holds the semi-conductor substrate which is adjoined and formed in the above-mentioned washing etching chamber, and is transported from the above-mentioned washing etching chamber, and carries out specified quantity rotation horizontally, While transporting the semi-conductor substrate washed or etched in the above-mentioned washing etching interior of a room to the above-mentioned semi-conductor substrate turning room It considers as a configuration equipped with the semi-conductor substrate migration means which transports [at the semi-conductor substrate rotation interior of a room] horizontally the semi-conductor substrate which carried out specified quantity rotation in the above-mentioned washing etching chamber, and the above-mentioned installation base is made to carry out installation support.

[010] Invention of claim 2 makes the semi-conductor substrate with which washing or etching was performed in the washing etching chamber secede from an installation base temporarily, after it rotates an installation base to specified quantity horizontal direction, it is returned to an installation base, and it carries out installation support of the semi-conductor substrate in a different part from last time.

[011] The solution means which invention of claim 2 provided concretely The washing etching chamber for washing or etching a semi-conductor substrate, and the stanchion set up by this washing etching interior of a room pivotable, At least three arm members which are held in the upper part of this stanchion and prolonged horizontally, While holding the semi-conductor substrate by which is semi-conductor wet equipment equipped with the installation base which is established in the point of each arm member and carries out installation support of the semi-conductor substrate, and installation support is carried out on the above-mentioned installation base and making it secede from the above-mentioned installation base It considers as a configuration equipped with a semi-conductor substrate maintenance means to make the above-mentioned installation base carry out installation support of the semi-conductor substrate currently held after a semi-conductor substrate secedes from the above-mentioned installation base and the above-mentioned stanchion carries out specified quantity rotation again.

[012] After invention of claim 3 reverses the semi-conductor substrate with which washing or etching was performed in the washing etching interior of a room in the next room, it is returned to a washing etching chamber, and where front flesh-side reversal is carried out, it carries out installation support of the semi-conductor substrate last time.

[013] The solution means which invention of claim 3 provided concretely The washing etching chamber for washing or etching a semi-conductor substrate, and the stanchion set up by this washing etching interior of a room pivotable, At least three arm members which are held in the upper part of this stanchion and prolonged horizontally, It is semi-conductor wet equipment equipped with the installation base which is established in the point of each arm member and carries out installation support of the semi-conductor substrate. The semi-conductor substrate reversal room which the semi-conductor substrate which is adjoined and formed in the above-mentioned washing etching chamber, and is transported from the above-mentioned washing etching chamber is held [room], and reverses the front flesh side, While transporting the semi-conductor substrate washed or etched in the above-mentioned washing etching interior of a room to the above-mentioned semi-conductor substrate reversal room It considers as a configuration equipped with the semi-conductor substrate migration means which transports the semi-conductor substrate which carried out front flesh-side reversal in the semi-conductor substrate reversal interior of a room to the above-mentioned washing etching chamber, and the above-mentioned installation base is made to carry out installation support.

[014] In order that invention of claim 4 may lessen the touch area of a semi-conductor substrate and an installation base, the above-mentioned installation base adds the configuration of having the pin member which carries out installation support of the semi-conductor substrate from the inferior surface of tongue on the top face to the configuration of claims 1-3.

[015]

[Function] If the semi-conductor substrate washed or etched in the washing etching chamber is transported to a semi-conductor substrate turning room with a semi-conductor substrate migration means, the semi-conductor substrate by which specified quantity rotation was horizontally carried out in this semi-conductor substrate turning room is returned to a washing etching chamber and an installation base is made to carry out installation support by the configuration of claim 1, in a different part from last time, installation support of the semi-conductor substrate will be carried out.

- [016] If specified quantity rotation of the stanchion is carried out by the configuration of claim 2 after holding the semi-conductor substrate by which installation support is carried out with a semi-conductor substrate maintenance means on an installation base, only an installation base will carry out specified quantity rotation horizontally. Then, if an installation base is made to carry out installation support of the semi-conductor substrate which the semi-conductor substrate maintenance means holds, a semi-conductor substrate will be supported by the installation base in a different part from last time.
- [017] If it returns to a washing etching chamber again and an installation base is made to carry out installation support of the semi-conductor substrate which transported the semi-conductor substrate washed or etched in the washing etching chamber to the semi-conductor substrate reversal room with the semi-conductor substrate migration means, and carried out front flesh-side reversal at the semi-conductor substrate reversal room by the configuration of claim 3, a semi-conductor substrate will be supported by the installation base with last time, where front flesh-side reversal is carried out.
- [018] Since the top face of an installation base is equipped with the pin member which carries out installation support of the semi-conductor substrate from the inferior surface of tongue by the configuration of claim 4 and the touch area of a semi-conductor substrate and an installation base decreases, as for an installation base, the drug solution breathed out to a semi-conductor substrate becomes is hard to be prevented.
- [019] Example] Hereafter, one example of this invention is explained based on a drawing.
- [020] Drawing 1 is the outline sectional view of the semi-conductor wet equipment concerning the 1st example of this invention. A washing etching chamber for 1 to perform wet washing or wet etching to the semi-conductor substrate 2 in this drawing, The etched film with which 3 was formed in the front rear face of the semi-conductor substrate 2, the holder which holds the projection semi-conductor substrate 2 upwards from each end of three installation bases 5 where 4 carries out installation support of the semi-conductor substrate 2, three support arms on which 6 holds each installation base 5 in the end section, the pivotable stanchion with which 7 holds the other end of each support arm 6, the drug solution regurgitation nozzle to which 8 carries out the regurgitation of the drug solution 9 to the semi-conductor substrate 2, and 10 are drug solution exhaust ports which discharge the drug solution 11 breathed out to the semi-conductor substrate 2.
- [021] Although the washing etching chamber 1 is adjoined, the semi-conductor substrate turning room 13 is formed as a description of **** 1 example and illustration was omitted in this semi-conductor substrate turning room 13, a semi-conductor substrate rotation means to carry out specified quantity rotation of the semi-conductor substrate 2 which held and held the semi-conductor substrate 2 transported from the washing etching chamber 1 horizontally is established.
- [022] Moreover, as a description of **** 1 example, while transporting the semi-conductor substrate 2 washed or etched in the washing etching chamber 1 to the semi-conductor substrate turning room 13, the semi-conductor substrate 2 which carried out specified quantity rotation is horizontally transported in this semi-conductor substrate turning room 13 in the washing etching chamber 1, and the semi-conductor substrate migration means 12 which carries out installation support again is formed in the installation base 5 at the boundary section of the washing etching chamber 1 and the semi-conductor substrate turning room 13.
- [023] Actuation of the semi-conductor wet equipment hereafter applied to the 1st example constituted as mentioned above is explained.
- [024] First, the drug solution which becomes the drug solution regurgitation nozzle 8 from the mixed liquor or entrant removers of a fluoric acid system (an acid, alkali, solvent, etc.) is introduced, and the introduced drug solution 9 is made to breathe out near the center section of the semi-conductor substrate 2 in the washing etching chamber 1. By rotating a stanchion 7 to coincidence, the semi-conductor substrate 2 by which installation support was carried out is horizontally rotated on the installation base 5, as a result this installation base 5, the breathed-out drug solution 9 is spread at the etched film 3 of the semi-conductor substrate 2, and washing and etching are performed to this etched film 3. The effluent of the used drug solution is carried out from the drug solution effluent opening 10.
- [025] In this case, although the part which is in contact with the holder 4 in the semi-conductor substrate 2 turns into neither a washing inadequate part nor the etching remaining part since a drug solution 9 is involved in the part which is in contact with the holder 4 in the semi-conductor substrate 2 during rotation, the installation base 5 and the support arm 6 in the semi-conductor substrate 2, and the part which has countered turn into a washing inadequate part and the etching remaining part.
- [026] Then, while stopping rotation of a stanchion 7, after stopping the regurgitation of the drug solution from

the drug solution regurgitation nozzle 8, the semi-conductor substrate 2 is moved to the semi-conductor substrate turning room 13 with the semi-conductor substrate migration means 12, and the semi-conductor substrate 2 which held and held the semi-conductor substrate 2 transported from the washing etching chamber in the semi-conductor turning room 13 -- a horizontal direction -- the specified quantity -- for example, it rotates 180 degrees. Next, the semi-conductor substrate 2 which carried out specified quantity rotation is horizontally returned again with the semi-conductor substrate migration means 12 in the washing etching chamber 1, and the installation base 5 is made to carry out installation support.

0027] If it does in this way, since installation support of the semi-conductor substrate 2 will be carried out on the installation base 5 in the condition of having rotated to last time and a 180-degree horizontal direction, the installation base 5 and the support arm 6 in the semi-conductor substrate 2, and the part which has countered differ from last time. In such the condition, the washing inadequate part in the semi-conductor substrate 2 if the regurgitation of the drug solution 9 is carried out to the semi-conductor substrate 2 from the drug solution regurgitation nozzle 8, and the etching remaining part are solved.

0028] Hereafter, the semi-conductor wet equipment concerning the 2nd example of this invention is explained.

0029] Although the washing etching chamber of structure and the semi-conductor substrate reversal room contiguous to this washing etching chamber are prepared like the 1st example of the above as a description of *** 2 example although illustration was omitted, and illustration omitted in this semi-conductor substrate reversal room, a semi-conductor substrate reversal means carry out the front flesh-side reversal of the semi-conductor substrate which held and held the semi-conductor substrate transported from the washing etching chamber is established.

0030] Moreover, as a description of **** 2 example, while transporting the semi-conductor substrate washed or etched in the washing etching chamber to a semi-conductor substrate reversal room, the semi-conductor substrate which carried out front flesh-side reversal in this semi-conductor substrate reversal interior of a room is transported to a washing etching chamber, and the semi-conductor substrate migration means which carries out installation support again is formed in the installation base at the boundary section of a washing etching chamber and a semi-conductor substrate reversal room.

0031] Actuation of the semi-conductor wet equipment hereafter applied to the 2nd example constituted as mentioned above is explained.

0032] First, in a washing etching chamber, while making a semi-conductor substrate breathe out a drug solution from a drug solution regurgitation nozzle, the semi-conductor substrate by which installation support was carried out on the installation base by rotating a stanchion is rotated horizontally, and washing and etching are performed to the etched film of a semi-conductor substrate. In this case, although the part which is in contact with the holder in a semi-conductor substrate turns into neither a washing inadequate part nor the etching remaining part, the installation base and support arm in a semi-conductor substrate, and the part which has countered turn into a washing inadequate part and the etching remaining part.

0033] Then, while stopping rotation of a stanchion, after stopping the regurgitation of the drug solution from a drug solution regurgitation nozzle, a semi-conductor substrate is moved to a semi-conductor substrate reversal room with a semi-conductor substrate migration means. And at a semi-conductor reversal room, front flesh-side reversal of the semi-conductor substrate which held and held the semi-conductor substrate transported from a washing etching chamber is carried out. Next, the semi-conductor substrate which carried out front flesh-side reversal is again returned to a washing etching chamber with a semi-conductor substrate migration means, and an installation base is made to carry out installation support.

0034] Since installation support will be carried out on an installation base after the semi-conductor substrate has carried out front flesh-side reversal with last time if it does in this way, the installation base and support arm in a semi-conductor substrate, and the part which has countered differ from last time. In such the condition, the washing inadequate part in a semi-conductor substrate if the regurgitation of the drug solution is carried out to a semi-conductor substrate, and the etching remaining part are solved.

0035] Hereafter, the semi-conductor sentiment concerning the 3rd example of this invention is explained.

0036] Although illustration was omitted as a description of **** 3 example in the same washing etching chamber as the 1st example of the above The semi-conductor substrate maintenance means is established. This semi-conductor substrate maintenance means While holding the semi-conductor substrate by which installation support is carried out on an installation base and making it secede from an installation base, after a semi-conductor substrate secedes from an installation base and a stanchion carries out specified quantity rotation horizontally, an installation base is made to carry out installation support of the semi-conductor substrate

urrently held again.

0037] Hereafter, the actuation of semi-conductor wet equipment constituted as mentioned above is explained.

0038] First, in a washing etching chamber, while making a semi-conductor substrate breathe out a drug solution from a drug solution regurgitation nozzle, by rotating a stanchion, the semi-conductor substrate by which installation support is carried out is horizontally rotated on an installation base, and washing and etching are performed to the etched film of a semi-conductor substrate. In this case, the installation base and support arm in a semi-conductor substrate, and the part which has countered turn into a washing inadequate part and the etching remaining part.

0039] Then, after making the above-mentioned semi-conductor substrate maintenance means drive, holding the semi-conductor substrate by which installation support is carried out on the installation base, after stopping the regurgitation of the drug solution from a drug solution regurgitation nozzle, while stopping rotation of a stanchion, and making it secede from an installation base, an installation base is made to carry out installation support of the semi-conductor substrate which holds the stanchion horizontally specified quantity, for example, after rotating 180 degrees, again.

0040] If it does in this way, since installation support of the semi-conductor substrate will be carried out on an installation base in the condition of having rotated to last time and a 180-degree horizontal direction, the installation base and support arm in a semi-conductor substrate, and the part which has countered differ from last time. In such the condition, the washing inadequate part in a semi-conductor substrate if the regurgitation of the drug solution is carried out to a semi-conductor substrate from a drug solution regurgitation nozzle, and the etching remaining part are solved.

0041] Drawing 2 shows the modification of the semi-conductor wet equipment concerning the above 1st - the 1st example, and as shown in this drawing, the pin member 14 which carries out installation support of the semi-conductor substrate 2 from the inferior surface of tongue protrudes on the top face of the installation base 5. For this reason, since the touch area of the semi-conductor substrate 2 and the installation base 5 decreases, as for the installation base 5, the drug solution breathed out to the semi-conductor substrate 2 becomes is hard to be prevented.

0042] (Table 1) indicates the comparison with the case where etching processing is performed to a semi-conductor substrate to be the case where etching processing is performed to a semi-conductor substrate using the semi-conductor wet equipment concerning the 1st example of the above using conventional semi-conductor wet equipment.

0043] Table 1]

	処理内容	エッチング残りの有無
従来の半導体ウェット装置	エッチング時間10分	載置台部分エッチ残り (1mm角程度)
第1実施例のウェット装置	エッチング時間3分、180度回転後エッチング時間3分	無し

0044] As a result of the semi-conductor wet equipment concerning the 1st example performing etching processing to a semi-conductor substrate using the conditions of (Table 1) so that clearly from (Table 1), the etching remaining part did not occur in a semi-conductor substrate.

0045] Effect of the Invention] The semi-conductor substrate turning room which according to the semi-conductor wet equipment concerning invention of claim 1 holds the semi-conductor substrate transported from a washing etching chamber, and carries out specified quantity rotation horizontally, Since it has a semi-conductor substrate migration means to transport horizontally the semi-conductor substrate which carried out specified

quantity rotation in a washing etching chamber while transporting the semi-conductor substrate washed or etched in the washing etching interior of a room to a semi-conductor substrate turning room, The semi-conductor substrate washed or etched in the washing etching chamber is transported to a semi-conductor substrate turning room with a semi-conductor substrate migration means. If it returns to a washing etching chamber and an installation base is made to carry out installation support, after carrying out specified quantity rotation horizontally in a semi-conductor substrate turning room, since installation support of the semi-conductor substrate will be carried out in a different part from last time, the washing inadequate part or the etching remaining part in a semi-conductor substrate are not generated.

[046] Since it has a semi-conductor substrate maintenance means to make an installation base carry out installation support of the semi-conductor substrate which holds the semi-conductor substrate by which installation support is carried out on an installation base, and is held after a stanchion carries out specified quantity rotation, while making it secede from an installation base again according to the semi-conductor wet equipment concerning invention of claim 2, If specified quantity rotation of the stanchion is carried out and an installation base is made to carry out installation support of the semi-conductor substrate which the semi-conductor substrate maintenance means holds after that after holding the semi-conductor substrate washed or etched with a semi-conductor substrate maintenance means and making it secede from an installation base since a semi-conductor substrate is supported by the installation base in a different part from last time, the washing inadequate part or the etching remaining part in a semi-conductor substrate are not generated.

[047] The semi-conductor substrate reversal room which according to the semi-conductor wet equipment concerning invention of claim 3 holds the semi-conductor substrate transported from a washing etching chamber, and carries out front flesh-side reversal, Since it has a semi-conductor substrate migration means to transport the semi-conductor substrate reversed while transporting the semi-conductor substrate washed or etched in the washing etching interior of a room to the semi-conductor substrate reversal room to a washing etching chamber, If it returns to a washing etching chamber and an installation base is made to carry out installation support after transporting the semi-conductor substrate washed or etched to a semi-conductor substrate reversal room with a semi-conductor substrate migration means and carrying out front flesh-side reversal at a semi-conductor substrate reversal room in a washing etching chamber Since installation support of the semi-conductor substrate is carried out where front flesh-side reversal is carried out with last time, the washing inadequate part or the etching remaining part in a semi-conductor substrate are not generated.

[048] Since according to the semi-conductor wet equipment concerning invention of claim 4 the top face of an installation base is equipped with the pin member which carries out installation support of the semi-conductor substrate from the inferior surface of tongue and the touch area of a semi-conductor substrate and an installation base decreases, as for an installation base, the drug solution breathed out to a semi-conductor substrate becomes is hard to be prevented.

[translation done.]

NOTICES *

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.This document has been translated by computer. So the translation may not reflect the original precisely.
 .**** shows the word which can not be translated.
 .In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

Brief Description of the Drawings]

- Drawing 1] It is the outline sectional view of the semi-conductor wet equipment in the 1st example of this invention.
- Drawing 2] It is the outline sectional view of the semi-conductor wet equipment concerning the 1st of this invention - the 3rd example.
- Drawing 3] It is the outline sectional view of conventional semi-conductor wet equipment.
- Drawing 4] It is the outline Kenjo ** Fig. of conventional semi-conductor wet equipment.

Description of Notations]

- Washing Etching Chamber
- Semi-conductor Substrate
- Etched Film
- Holder
- Installation Base
- Support Arm
- Stanchion
- Drug Solution Regurgitation Nozzle
- Breathed-Out Drug Solution
- 0 Drug Solution Effluent Opening
- 1 Drug Solution Discharged
- 2 Semi-conductor Substrate Migration Means
- 3 Semi-conductor Substrate Turning Room
- 4 Pin Member

[translation done.]